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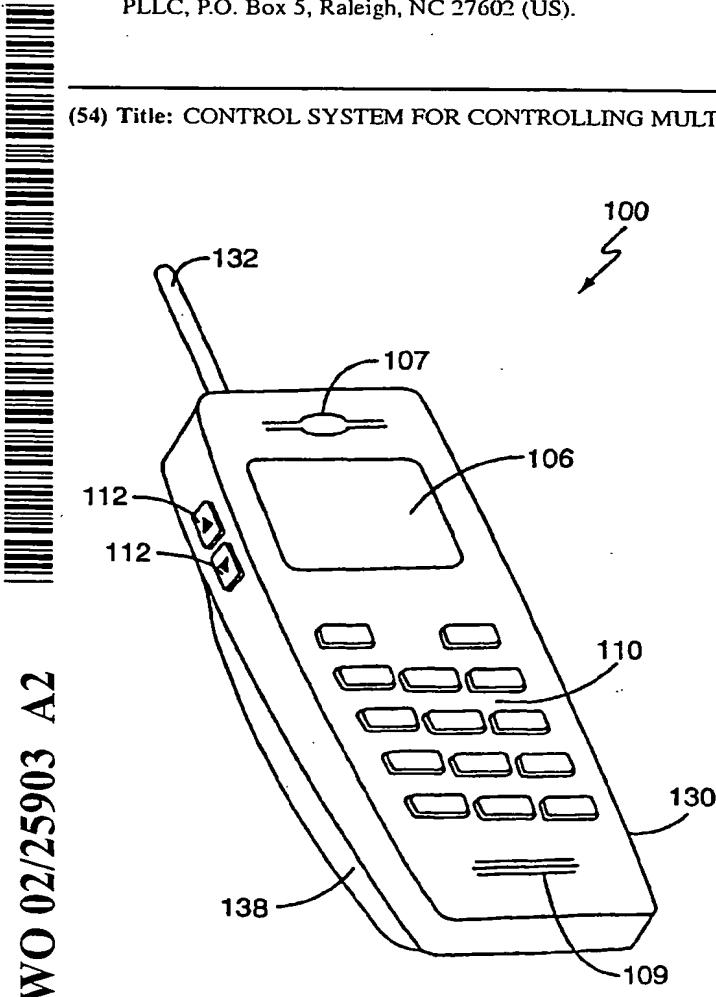
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(54) Title: CONTROL SYSTEM FOR CONTROLLING MULTIPLE FUNCTIONS OF A MOBILE TERMINAL



(57) Abstract: A mobile terminal, such as a cellular radiotelephone, is provided with two spaced apart control buttons on the side thereof, operative to control a plurality of controllable functions. In one embodiment, when a call is in progress, pressing either control button adjusts the speaker volume; simultaneously single clicking both buttons toggles a microphone mute control; and simultaneously double clicking both buttons sets the speaker volume to a maximum level. When a call is not in progress, pressing either control button scrolls the menu display; simultaneously single clicking both buttons cancels a highlighted menu choice; and simultaneously double clicking both buttons selects a highlighted menu choice. This provides the user a greater degree of control over the operating parameters of the mobile terminal during a call without interrupting the call by removing the mobile terminal from its operative position, and allows for one-handed navigation of displayed menus when a call is not in progress.

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CONTROL SYSTEM FOR CONTROLLING MULTIPLE FUNCTIONS OF A MOBILE TERMINAL

BACKGROUND OF THE INVENTION

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Wireless communications systems have experienced phenomenal growth in recent years. By 1999, there were more than 400 million cellular telephone subscriptions worldwide, with that figure widely expected to exceed one billion by 2005.

As increased demand spurs the growth of greater infrastructure, more areas are 10 covered by higher strength radio frequency cellular carrier signals. This reduces the power level at which mobile terminals (e.g., cellular telephones) must operate to establish wireless communications, allowing them to employ smaller transmitters, antennas, and batteries. The reduced power requirements, along with increases in microelectronics, packaging, and battery technology, have allowed for the evolution of increasingly smaller 15 and more compact mobile terminals.

At the same time, advanced users continue to demand more options and features in mobile terminals. In this regard, functions such as messaging pagers, voicemail, email, and Internet access have been integrated into mobile terminals, in addition to traditional cellular telephone functionality. This increased functionality requires both more complex 20 and sophisticated menu displays, and more control inputs to effectively control and utilize these advanced features.

The keypad of the modern mobile terminal has decreased in size while the number of keys or buttons presented to the user has increased. Since the keypad is limited in its miniaturization by ergonomic considerations, the number of buttons available may 25 effectively limit the number of features that can be integrated into the mobile terminal.

Partially in response to the crowded keypad, and additionally for enhanced ergonomics, it is known in the mobile terminal industry to locate control buttons separately from the mobile terminal's keypad. In particular, it is known to provide a pair of spaced apart control buttons on one side of the mobile terminal. These buttons, often 5 marked with "up" and "down" indicia, typically serve to increase or decrease, respectively, the volume level of the mobile terminal's speaker. Some mobile terminals additionally utilize these buttons to scroll the menu display up or down when a call is not in progress.

These control buttons improve the mobile terminal's ergonomics and ease of use in two ways. During a call with a conventional mobile terminal, a user must remove the 10 mobile terminal from its operative position to access the keypad to control the terminal's operating characteristics, necessitating a break in his or her conversation. Placing the directional control buttons on the side of the mobile terminal allows the user to manipulate them during a call, without interruption. Additionally, when a call is not in progress and the user is accessing the mobile terminal's features through its menu display, such as 15 checking email or accessing the Internet, it would often be advantageous to carry out the menu navigation with only one hand.

BRIEF SUMMARY OF THE INVENTION

The present invention comprises a mobile terminal having a pair of spaced apart 20 control buttons adapted to control multiple functions of the mobile terminal. In one embodiment, the pressing of either button controls one function while the simultaneous single clicking of both buttons controls a second function. Further, an additional function can be controlled by the simultaneous double clicking of both buttons. The functions controlled by the two buttons can vary. Examples of functions controlled by the buttons

include controlling speaker volume, the muting of a microphone, menu scrolling, and menu selection and cancellation.

In another embodiment, the present invention comprises a method of controlling multiple functions of a mobile terminal via the pair of spaced apart buttons. By selectively 5 pressing or clicking one of the buttons, or both buttons simultaneously, various functions can be controlled. In one particular method, if a call is in progress, the speaker volume can be increased, decreased or set to a maximum level, or the microphone may be muted by selectively actuating the buttons. If a call is not in progress, the control buttons can be utilized to scroll the menu display, and to select or cancel menu choices.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a wireless mobile communications terminal, showing the control buttons on the side thereof.

Figure 2 is a functional block diagram of a mobile terminal.

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DETAILED DESCRIPTION OF THE INVENTION

The present invention will be discussed in the context of a wireless communications mobile terminal. As used herein, the term "mobile terminal" may include a cellular radiotelephone with or without a multi-line display; a Personal Communications 20 System (PCS) terminal that may combine a cellular radiotelephone with data processing, facsimile and data communications capabilities; a Personal Digital Assistant (PDA) that can include a radiotelephone, pager, Internet/intranet access, Web browser, organizer, calendar and/or a global positioning system (GPS) receiver; and a conventional laptop and/or palmtop receiver or other appliance that includes a radiotelephone transceiver. 25 Mobile terminals may also be referred to as "pervasive computing" devices.

Figure 1 shows a representative mobile terminal indicated generally by the numeral 100. Mobile terminal 100 includes a housing 130. A keypad 110 and a display 106 are disposed in housing 130 on the front of mobile terminal 100. An antenna 132 extends from an upper portion of the housing 130. Disposed on the left side of housing 130 are a 5 pair of control buttons 112. Control buttons 112 are to be distinguished from the buttons that form the keypad 110. Particularly, control buttons 112 are located on the side of the mobile terminal 100, and can be actuated while a call is in progress and the mobile terminal is being held by the user in an operative position.

Disposed within the housing 130 are a speaker 104 and mutable microphone 102 10 (see Figure 2). Audible sounds travel to the user from speaker 104 and from the user to microphone 102 through slots 107 and 109, respectively, formed in housing 130. The housing 130 also contains appropriate communications electronics 134 (see Figure 2), as described more fully below. Power is supplied to the mobile terminal 100 by battery pack 138 that typically attaches to the back of the housing 130.

15 The mobile terminal 100 of Figure 1 is illustrative only, and depicts one configuration of a mobile terminal 100. In general, mobile terminals 100 are produced in a broad array of sizes and shapes. Some mobile terminals 100 feature folding, sliding, or otherwise extending parts, providing a more compact form factor when not in use.

Figure 2 is a block diagram of a typical mobile terminal 100 showing one 20 embodiment of an operator interface 101 and the communications electronics 134. Operator interface 101 contains the devices and functions necessary for the user to engage in voice communications using mobile terminal 100, as well as the inputs and display necessary for the user to control the functions of the mobile terminal 100.

Communications electronics 134 contains the circuits and devices necessary for mobile

terminal 100 to form a fully functional radio transceiver capable of transmitting and receiving digital or analog communications signals. Specifically, communications electronics 134 is connected to antenna 132, and may include control unit 114, transmitter 120, and receiver 140.

5 The operator interface 101 includes a display 106, keypad 110, control buttons 112, an interface control unit 108, microphone 102, microphone mute control 103, speaker 104, and speaker volume control 105. Display 106 allows the user to see dialed digits and call status information, and displays menus by which the user selects modes and features, and otherwise controls the operation of the mobile terminal 100. Keypad 110 permits the 10 operator to dial numbers, enter commands, and select options. The control buttons 112, described more fully below, control a variety of functions and features of the mobile terminal 100 by the selective actuation of one or both of them, separately or together. Microphone 102 receives audio signals from the user and converts the audio signals to analog signals that are passed to the transmitter 120. Microphone mute control 103 15 selectively connects and disconnects the microphone 102 from the transmitter 120. Speaker 104 converts analog signals from the receiver 140 to audio signals that can be heard by the user. The volume of speaker 104 is controlled by speaker volume control 105. Interface control unit 108 interfaces the display 106, keypad 110, control buttons 112, microphone mute control 103, and speaker volume control 105 with the control unit 20 114.

Viewing the communications electronics 134, as seen in Figure 2, the analog signals from the microphone 102 are directed to the transmitter 120, through the microphone mute control 103. The transmitter 120 includes an analog to digital converter 122, a digital signal processor 124, a modulator 126, and an amplifier 128. The analog to

digital converter 122 changes the analog signal from the microphone 102 into a digital signal. The digital signal is passed to the digital signal processor (DSP) 124. The digital signal processor 124 compresses the digital signal and inserts error detection, error correction and signaling information. The compressed and encoded signal from the digital 5 signal processor 124 is passed to the modulator 126. RF frequency generator 125 generates a reference carrier frequency, and passes it to modulator 126. The modulator 126 converts the digital signal to a form that is suitable for transmission on a RF carrier. The amplifier 128 then boosts the output of the modulator 126 for transmission via antenna 132.

10 The receiver 140 includes a low noise amplifier 142, a received signal processor 144, and a digital to analog converter 146. Received signals are passed to the low noise amplifier 142 that boosts the low-level RF digital signal to a level appropriate for input to the digital signal processor 144. The digital signal processor 144 includes a demodulator and channel decoder. The demodulator extracts the transmitted bit sequence from the 15 received signal. The channel decoder detects and corrects channel errors in the received signal. The channel decoder also separates control and signaling data from speech data. The digital signal processor 144 may also include an equalizer to compensate for phase and amplitude distortion of the transmitted signal. The control and signaling data is passed to the control unit 114. Speech data is processed by a speech decoder and passed 20 to the digital to analog converter 146. The digital to analog converter 146 converts the speech data into an analog signal that is applied to the speaker 104 to generate audible signals that can be heard by the user. The transmitter 120 and receiver 140 are coupled to the antenna 132. The antenna 132 is used for both transmission and reception.

Control unit 114, such as a programmed microprocessor, functions to coordinate the operation of the transmitter 120 and the receiver 140. These functions include power control, channel selection, timing, as well as a host of other functions. The control unit 114 inserts signaling messages into the transmitted signals and extracts signaling messages 5 from the received signals. In a mobile terminal 100, the control unit 114 responds to any base station commands contained in the signaling messages, and implements those commands. When the user enters commands via the keypad 110 or control buttons 112, the commands are transferred to the control unit 114 for action.

The control unit 114 is operatively connected to memory 116, which may comprise 10 any mixture of RAM, ROM, EEPROM, etc., as is well known in the art. Memory 116 may be used for storage of various programmed features and functions, accessed and controlled via menus displayed on display 106 and control inputs received from keypad 110 or control buttons 112.

As described above, control buttons 112 may be located on the side of mobile 15 terminal 100, and may be provided with directional indicia, such as "up" and "down" directional arrowheads. So mounted, the control buttons 112 are readily accessible during a telephonic conversation. As will be appreciated from subsequent portions of this disclosure, the user may adjust the operating parameters of the mobile terminal 100 without interrupting his or her conversation, as would be necessary to access the buttons 20 on the traditional keypad.

Mobile terminal 100 can be programmed to include a plurality of controllable functions. Such functions may, for example, include controlling the speaker volume, muting the microphone, scrolling the menu display, and controlling menu item selection and cancellation. Specifically, control unit 114 may be programmed to include these

controllable functions, and these controllable functions may be programmed so as to be controlled by the user through selective actuation of control buttons 112.

One example of a controllable function that may be controlled by control buttons 112 is adjustment of the volume of speaker 104. However, there are several controllable 5 functions that can be controlled during a call without the necessity of removing the mobile terminal 100 from the user's ear and thus interrupting his or her conversation. For example, ambient noises often increase suddenly and dramatically, particularly outdoors. Is this situation, repeatedly pressing, or pressing and holding, one control button 112 to increase the volume of speaker 104 results in a slow ramp-up of the speaker's volume, 10 causing the user to miss several seconds of the conversation. A way to instantly set the volume of speaker 104 to a maximum level would thus be desirable. As another example, the mobile terminal user may encounter a situation in which he or she needs to address a third party, and wishes to mute the mobile terminal's microphone 102 so as to exclude that exchange from the telephonic conversation. Immediate control of the microphone mute 15 control 103 would thus be desirable.

Furthermore, there are many times when a mobile terminal user is not engaged in a call, and wishes to access one or more of the mobile terminal's features through its scrolling menu display. If the user were engaged simultaneously in another activity, such as writing, or reading an address book or instruction manual, he or she may wish to 20 navigate the menu, choosing and canceling menu selections, using only one hand. The control buttons 112 may thus also be programmed to control menu navigation functions.

As noted above, numerous functions of the mobile terminal 100 can be controlled by the control buttons 112. In particular, the individual functions can be selected and then, through programming, associated with a particular pattern of actuation of the control

buttons 112. For example, some functions can be controlled by simply pressing one or both buttons, while other functions may require simultaneous single or double clicking of the control buttons 112. As used herein, the term "clicking" refers to the pressing or actuation, and optionally the subsequent release, of one or more buttons. Furthermore, as

5 used herein, "single clicking" refers to clicking one or more buttons once within a predefined time period, i.e., the pressing and releasing, or pressing and holding, of one or more buttons a single time within a predefined time period. "Double clicking" refers to the clicking of one or more buttons twice within a predefined time period, i.e., the pressing and releasing of one or more buttons, followed by a second pressing and releasing, or

10 pressing and holding, of the same button or buttons within a predefined time period.

"Single clicking" and "double clicking" are mutually exclusive keystrokes. Specifically, double clicking does not include single clicking. The time periods that define the single and/or double clicking keystrokes may be set, or may be programmable by the user.

Expiration of the time periods may be detected by expiration of a count-down timer, which

15 may be a separate electronic circuit under the control of interface control unit 108 or control unit 114. Alternatively, the time periods may be tracked by software in control unit 114, or by other means, as are well known in the art.

One illustrative example of possible functions of the mobile terminal 100 that may be controlled by various actuations of control buttons 112 is presented in Table 1 below.

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Table 1: Control Button Keystrokes and Controllable Functions

Control Button Keystroke	Call in Progress (Operating Parameters)	No Call in Progress (Menu Access)
"Up" Button Press	Speaker Volume Increase	Scroll Display Up

“Down” Button Press	Speaker Volume Decrease	Scroll Display Down
Both Buttons Single Click	Toggle Mute Control	Cancel Menu Item
Both Buttons Double Click	Set Speaker Volume to Maximum Level	Select Menu Item

The functionality described in Table 1 is illustrative only, and the present invention is not limited thereby. Other combinations of keystrokes and controllable functions may be employed as needed or desired for a given application, and such combinations would 5 fall within the scope of the present invention.

Thus, while the present invention has been described illustratively herein with reference to various specific embodiments, aspects and features, it will be recognized that the invention is not thus limited, but encompasses numerous variations, modifications and other embodiments, and accordingly such other variations, modifications and other 10 embodiments are to be regarded as being within the scope of the present invention as claimed.

CLAIMS

What is claimed is:

1. A mobile terminal comprising a plurality of controllable functions and pair of control buttons adapted to control one of the controllable functions in response to either of the control buttons being pressed, and further adapted to control a second controllable function in response to the simultaneous single clicking of both control buttons.
2. The mobile terminal of claim 1 wherein said mobile terminal further comprises a speaker with a controllable volume, a mutable microphone, and a display operative to display a scrolling menu, and wherein said controllable functions controlled by said control buttons are selected from the group consisting of controlling speaker volume, controlling the muting of the microphone, controlling menu scrolling, and controlling menu selection and cancellation.
3. The mobile terminal of claim 1 wherein said control buttons are further adapted to control a third controllable function in response to the simultaneous double clicking of both control buttons.
4. A mobile terminal comprising a plurality of controllable functions and a pair of control buttons adapted to control one of said controllable functions in response to the simultaneous single clicking of both said control buttons.
5. The mobile terminal of claim 4 wherein said mobile terminal further comprises a speaker with a controllable volume, a mutable microphone, and a display operative to display a scrolling menu, and wherein said controllable functions controlled by said control buttons are selected from the group consisting of controlling speaker volume, controlling the muting of the microphone, controlling menu scrolling, and controlling menu selection and cancellation.

6. The mobile terminal of claim 4 wherein said control buttons are further adapted to control a second controllable function in response to the simultaneous double clicking of both said control buttons.
7. The mobile terminal of claim 4 wherein said control buttons are further adapted to 5 control a third controllable function in response to either of said control buttons being pressed.
8. A method of controlling a mobile terminal comprising first and second control buttons, a speaker with controllable volume, a mutable microphone, and a scrolling menu display, comprising:
 - 10 if a call is in progress,
 - increasing the volume of said speaker by clicking said first button;
 - decreasing the volume of said speaker by clicking said second button;
 - toggling said microphone between operative and muted states by simultaneously single clicking said first and second buttons; and
 - 15 setting the volume of said speaker at a maximum level by simultaneously double clicking said first and second buttons; and
- if a call is not in progress,
 - scrolling the menu of said display up by clicking said first button;
 - scrolling the menu of said display down by clicking said second button;
- 20 canceling a highlighted menu choice on the menu of said display by simultaneously single clicking said first and second buttons; and
- selecting a highlighted menu choice on the menu of said display by simultaneously double clicking said first and second buttons.

9. A mobile terminal, comprising:

a speaker with a controllable volume;

a mutable microphone;

5 a display operative to display a scrolling menu; and

first and second spaced apart control buttons, operatively configured such that,

if a call is in progress,

the volume of said speaker is increased by clicking said first button;

the volume of said speaker is decreased by clicking said second button;

10 said microphone is toggled between operative and muted states by simultaneously

single clicking said first and second buttons; and

the volume of said speaker is set at a maximum level by simultaneously double

clicking said first and second buttons; and

if a call is not in progress,

15 the menu of said display is scrolled up by clicking said first button;

the menu of said display is scrolled down by clicking said second button;

a highlighted menu choice on the menu of said display is cancelled by

simultaneously single clicking said first and second buttons; and

a highlighted menu choice on the menu of said display is selected by

20 simultaneously double clicking said first and second buttons within a

predefined time period.

10. The mobile terminal of claim 9, wherein said mobile terminal has a front and back and two sides, and wherein said control buttons are disposed in spaced apart relationship on one of said sides of said mobile terminal.

11. In a mobile terminal comprising a keypad, a plurality of controllable functions and a pair of control buttons wherein the pressing of either control button controls one of the controllable functions, a method of expanding the functionality of said control buttons, comprising:

5 associating a second controllable function with said pair of control buttons; and
controlling said second controllable function by simultaneously single clicking said
pair of control buttons.

12. The method of claim 11 wherein said mobile terminal further comprises a speaker with
a controllable volume, a mutable microphone, and a display operative to display a
10 scrolling menu, and wherein said controllable functions controlled by said control
buttons are selected from the group consisting of controlling speaker volume,
controlling the muting of the microphone, controlling menu scrolling, and controlling
menu selection and cancellation.

13. The method of claim 11 further comprising:

15 associating a third controllable function with said pair of control buttons; and
controlling said third controllable function by simultaneously double clicking said pair
of control buttons.

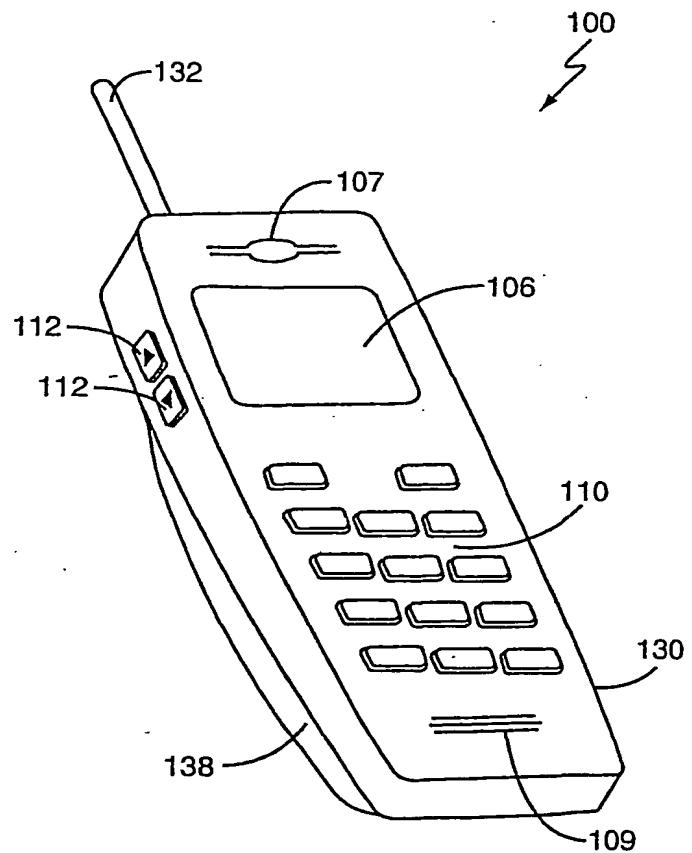


FIG. 1

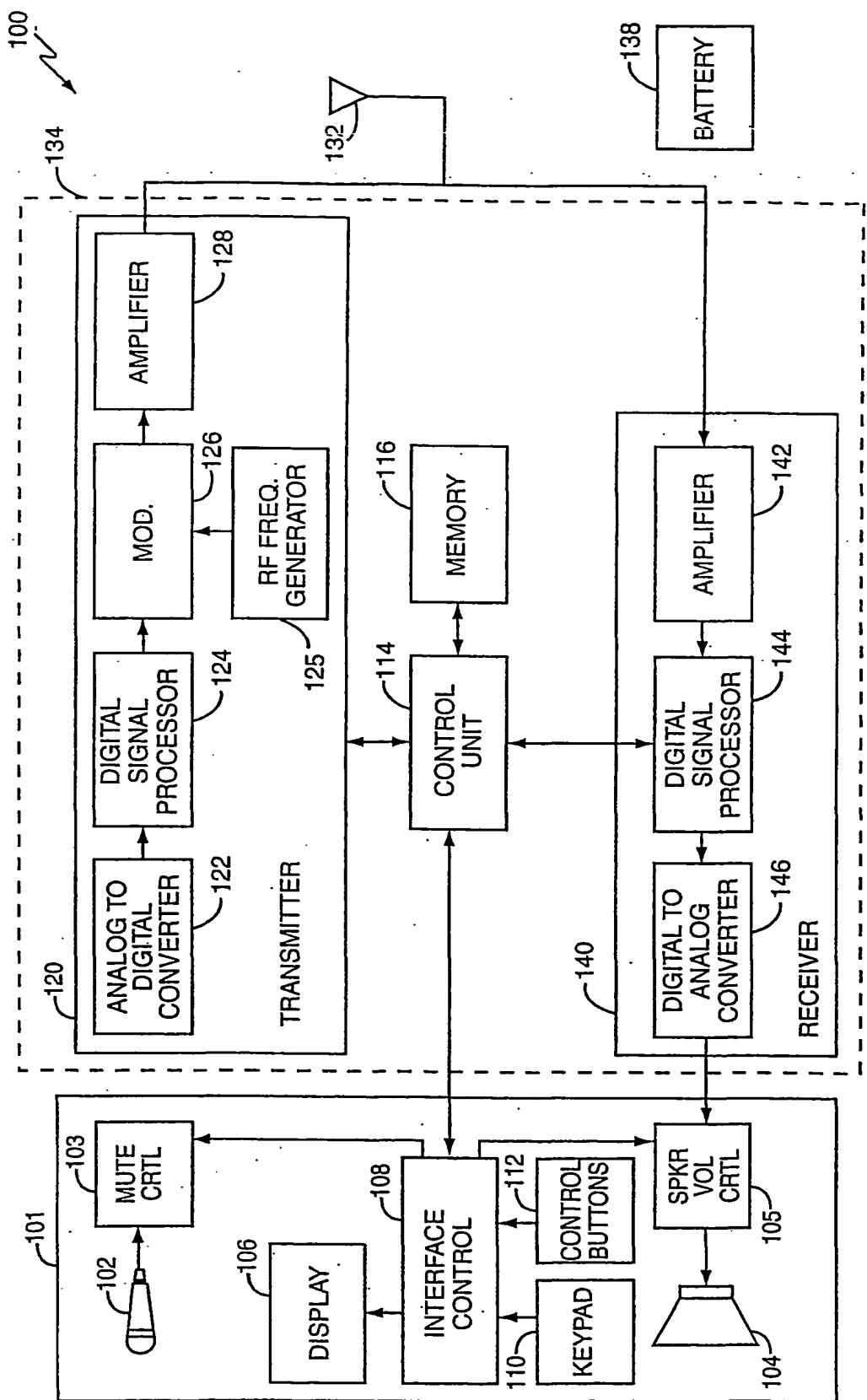


FIG. 2

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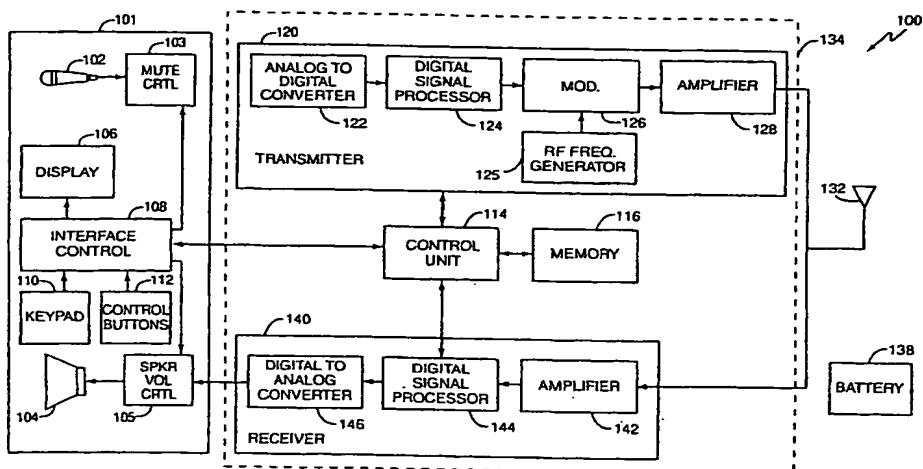
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(54) Title: SYSTEM FOR CONTROLLING MULTIPLE FUNCTIONS WITH THE HELP OF CONTROL KEYS IN A MOBILE TERMINAL



(57) Abstract: A mobile terminal, such as a cellular radiotelephone, is provided with two spaced apart control buttons on the side thereof, operative to control a plurality of controllable functions. In one embodiment, when a call is in progress, pressing either control button adjusts the speaker volume; simultaneously single clicking both buttons toggles a microphone mute control; and simultaneously double clicking both buttons sets the speaker volume to a maximum level. When a call is not in progress, pressing either control button scrolls the menu display; simultaneously single clicking both buttons cancels a highlighted menu choice; and simultaneously double clicking both buttons selects a highlighted menu choice. This provides the user a greater degree of control over the operating parameters of the mobile terminal during a call without interrupting the call by removing the mobile terminal from its operative position, and allows for one-handed navigation of displayed menus when a call is not in progress.

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IPC 7 H04M1/725 H04M1/247

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT
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Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 422 656 A (CANOVA JR FRANCIS J ET AL) 6 June 1995 (1995-06-06) abstract column 2, line 61 -column 3, line 5 column 7, line 37 - line 66 figures 1,6	1,4
Y	WO 97 34399 A (INTRINSIC SOLUTIONS INC) 18 September 1997 (1997-09-18) page 13, line 23 -page 15, line 13 page 42, line 25 -page 43, line 2 page 44, line 20 - line 29	2,3,5-13
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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PCT/US 01/26713

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	DE 199 26 334 A (KAMECKE KELLER ORLA) 21 December 2000 (2000-12-21) claims 4,5	1,4,11
P, Y	column 2, line 51 -column 3, line 37 figure 2	2,3, 5-10,12, 13
A	EP 1 032 183 A (NOKIA MOBILE PHONES LTD) 30 August 2000 (2000-08-30) abstract column 1, line 3 - line 17 column 2, line 37 - line 39 column 3, line 23 -column 4, line 23 column 5, line 2 - line 55 column 9, line 24 - line 33	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/26713

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5422656	A	06-06-1995	JP	7193620 A		28-07-1995
WO 9734399	A	18-09-1997	US	5790652 A		04-08-1998
			AU	715523 B2		03-02-2000
			AU	2206397 A		01-10-1997
			BR	9710647 A		11-01-2000
			CN	1218593 A		02-06-1999
			EP	0886946 A1		30-12-1998
			JP	2001503887 T		21-03-2001
			WO	9734399 A1		18-09-1997
			US	5917905 A		29-06-1999
DE 19926334	A	21-12-2000	DE	19926334 A1		21-12-2000
EP 1032183	A	30-08-2000	GB	2347315 A		30-08-2000
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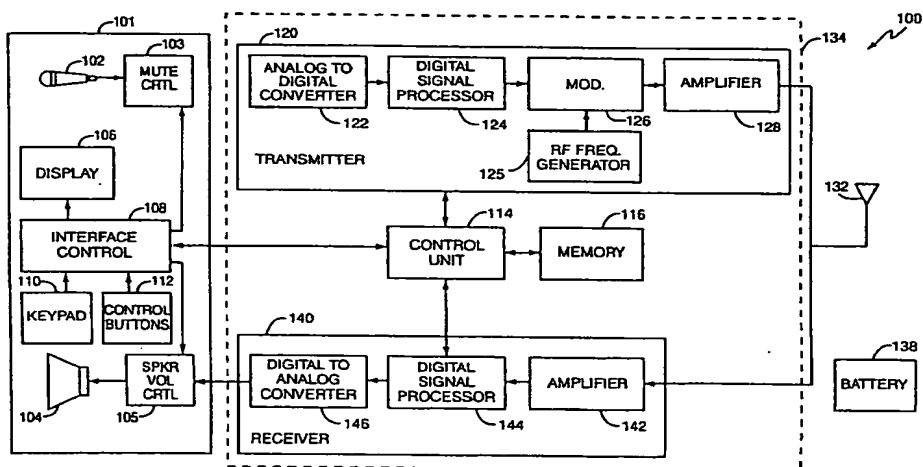
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(54) Title: SYSTEM FOR CONTROLLING MULTIPLE FUNCTIONS WITH THE HELP OF CONTROL KEYS IN A MOBILE TERMINAL



(57) **Abstract:** A mobile terminal, such as a cellular radiotelephone, is provided with two spaced apart control buttons on the side thereof, operative to control a plurality of controllable functions. In one embodiment, when a call is in progress, pressing either control button adjusts the speaker volume; simultaneously single clicking both buttons toggles a microphone mute control; and simultaneously double clicking both buttons sets the speaker volume to a maximum level. When a call is not in progress, pressing either control button scrolls the menu display; simultaneously single clicking both buttons cancels a highlighted menu choice; and simultaneously double clicking both buttons selects a highlighted menu choice. This provides the user a greater degree of control over the operating parameters of the mobile terminal during a call without interrupting the call by removing the mobile terminal from its operative position, and allows for one-handed navigation of displayed menus when a call is not in progress.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AMENDED CLAIMS

[received by the International Bureau on 17 May 2002 (17.05.02);
original claims 1 and 4 amended; remaining claims unchanged (4 pages)]

+ statement.

1. A mobile terminal comprising a plurality of controllable functions and pair of control buttons adapted to control one of the controllable functions in response to either of the control buttons being pressed, and further adapted to control a second controllable function in response to the simultaneous single clicking of both control buttons, with no further input other than said single clicking.
2. The mobile terminal of claim 1 wherein said mobile terminal further comprises a speaker with a controllable volume, a mutable microphone, and a display operative to display a scrolling menu, and wherein said controllable functions controlled by said control buttons are selected from the group consisting of controlling speaker volume, controlling the muting of the microphone, controlling menu scrolling, and controlling menu selection and cancellation.
3. The mobile terminal of claim 1 wherein said control buttons are further adapted to control a third controllable function in response to the simultaneous double clicking of both control buttons.
4. A mobile terminal comprising a plurality of controllable functions and a pair of control buttons adapted to control one of said controllable functions in response to the simultaneous single clicking of both said control buttons, with no further input other than said single clicking.
5. The mobile terminal of claim 4 wherein said mobile terminal further comprises a speaker with a controllable volume, a mutable microphone, and a display operative to display a scrolling menu, and wherein said controllable functions controlled by said control buttons are selected from the group consisting of controlling speaker volume, controlling the

muting of the microphone, controlling menu scrolling, and controlling menu selection and cancellation.

6. The mobile terminal of claim 4 wherein said control buttons are further adapted to control a second controllable function in response to the simultaneous double clicking of both said control buttons.
7. The mobile terminal of claim 4 wherein said control buttons are further adapted to control a third controllable function in response to either of said control buttons being pressed.
8. A method of controlling a mobile terminal comprising first and second control buttons, a speaker with controllable volume, a mutable microphone, and a scrolling menu display, comprising:

if a call is in progress,

increasing the volume of said speaker by clicking said first button;

decreasing the volume of said speaker by clicking said second button;

toggling said microphone between operative and muted states by simultaneously

single clicking said first and second buttons; and

setting the volume of said speaker at a maximum level by simultaneously double

clicking said first and second buttons; and

if a call is not in progress,

scrolling the menu of said display up by clicking said first button;

scrolling the menu of said display down by clicking said second button;

canceling a highlighted menu choice on the menu of said display by simultaneously

single clicking said first and second buttons; and

selecting a highlighted menu choice on the menu of said display by simultaneously

double clicking said first and second buttons.

9. A mobile terminal, comprising:

a speaker with a controllable volume;

a mutable microphone;

a display operative to display a scrolling menu; and

first and second spaced apart control buttons, operatively configured such that,

if a call is in progress,

- the volume of said speaker is increased by clicking said first button;
- the volume of said speaker is decreased by clicking said second button;
- said microphone is toggled between operative and muted states by simultaneously single clicking said first and second buttons; and
- the volume of said speaker is set at a maximum level by simultaneously double clicking said first and second buttons; and

if a call is not in progress,

- the menu of said display is scrolled up by clicking said first button;
- the menu of said display is scrolled down by clicking said second button;
- a highlighted menu choice on the menu of said display is cancelled by simultaneously single clicking said first and second buttons; and
- a highlighted menu choice on the menu of said display is selected by simultaneously double clicking said first and second buttons within a predefined time period.

10. The mobile terminal of claim 9, wherein said mobile terminal has a front and back and two sides, and wherein said control buttons are disposed in spaced apart relationship on one of said sides of said mobile terminal.

11. In a mobile terminal comprising a keypad, a plurality of controllable functions and a pair of control buttons wherein the pressing of either control button controls one of the controllable functions, a method of expanding the functionality of said control buttons, comprising:

associating a second controllable function with said pair of control buttons; and controlling said second controllable function by simultaneously single clicking said pair of control buttons.

12. The method of claim 11 wherein said mobile terminal further comprises a speaker with a controllable volume, a mutable microphone, and a display operative to display a scrolling menu, and wherein said controllable functions controlled by said control buttons are selected from the group consisting of controlling speaker volume, controlling the muting of the microphone, controlling menu scrolling, and controlling menu selection and cancellation.

13. The method of claim 11 further comprising:

associating a third controllable function with said pair of control buttons; and controlling said third controllable function by simultaneously double clicking said pair of control buttons.

STATEMENT UNDER ARTICLE 19 (1)

Pursuant to Article 19(1) the claims have been amended.

In particular, claims 1 and 4 have been amended.

Claims 2, 3 and 5 through 13 remain unchanged.

Enclosed please find replacement pages 12 through 16 to replace pages 12 through 17 of the original application.